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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/632,495	07/31/2003	Brian K. Aegerter	6884-66364-01	4402

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EXAMINER

VINH, LAN

ART UNIT PAPER NUMBER

1765

DATE MAILED: 08/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/632,495

Applicant(s)

AEGERTER ET AL.

Examiner

Lan Vinh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 July 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24, 26-34, 52-59 and 65-71 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18, 21, 22, 24, 26-34, 52-59, 65 and 66 is/are rejected.
- 7) ☒ Claim(s) 19, 20, 23 and 67-71 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7/10/2006 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 26-34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In lines 7-8 of claim 26, it is unclear whether the limitation of "supplying a first fluid to the first chamber portion to expose the first side and the peripheral edge to the first fluid while contacting no more than an outer margin of the second side from exposure to the first fluid" means contacting the second side with the first fluid or contacting no more than an outer margin of the second side with the first fluid. Further clarification is requested. Claims 27-34 are indefinite because they depend on claim 26

For the purpose of examination, the limitation of “supplying a first fluid to the first chamber portion to expose the first side and the peripheral edge to the first fluid while contacting no more than an outer margin of the second side from exposure to the first fluid” as best understood as “supplying a first fluid to the first chamber portion to expose the first side and the peripheral edge to the first fluid while contacting no more than an outer margin of the second side to the first fluid”

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 52 is rejected under 35 U.S.C. 102(b) as being anticipated by Shinbara (US, 4788,994)

Shinbara discloses a method for treating wafer with liquid, the wafer/workpiece having a front/first side and an opposing back/second side and a peripheral edge defined between the first and second side, the method comprises:

placing the wafer/workpiece in a housing/reaction chamber (fig. 1)

supplying a first fluid provided by nozzle 22 to the chamber to expose the front/first side and the peripheral edge to the first fluid while excluding at least a major portion of the back/second side from exposure to the first fluid, wherein the major portion of the second side excludes an outer margin of the second side (col 6, lines 60-65, fig. 1-2)

5. Claim 53-55 are rejected under 35 U.S.C. 102(b) as being anticipated by Shinbara (US 4,788,994)

Shinbara discloses a method for treating wafer with liquid, the wafer/workpiece having a front/first side and an opposing back/second side and a peripheral edge defined between the first and second side, the method comprises:

placing the wafer/workpiece in a housing/chamber that includes an upper portion/ first chamber portion receiving the first side of the wafer/workpiece and a lower portion/second chamber portion receiving the second side of the wafer/workpiece, a perimeter portion receiving the edge of the wafer, a fluid nozzle 22 proximates the edge of the wafer (fig. 1)

supplying a first fluid provided by nozzle 22 to the first chamber portion to expose the front/first side to the first fluid while excluding any portion that is not an outer margin of the back/second side from exposure to the first fluid, the first fluid flow through the outlet 22 in the edge portion of the wafer (col 6, lines 60-65; fig. 1)

Regarding claims 54-55, Shinbara discloses exposing the edge of the wafer and the edge of the back side/second side to the first fluid (fig. 1-2)

6. Claim 56-59 are rejected under 35 U.S.C. 102(b) as being anticipated by Shinbara (US 4,788,994)

Shinbara discloses a method for treating wafer with liquid, the wafer/workpiece having a front/first side and an opposing back/second side and a peripheral edge defined between the first and second side, the method comprises:

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placing the wafer/workpiece in a housing/chamber that includes an upper portion/ first chamber portion receiving the first side of the wafer/workpiece and a lower portion/second chamber portion receiving the second side of the wafer/workpiece, a perimeter portion receiving the edge of the wafer (fig. 1)

supplying a first fluid provided by nozzle 22 to the first chamber portion to expose the front/first side and the edge/outer margin of the second side to the first fluid while excluding the remainder of the back/second side from exposure to the first fluid, the first fluid flow through the outlet 22 in the edge portion of the wafer (col 6, lines 60-65; fig. 1-2)

The limitation of claim 57 has been discussed above

Regarding claim 58, fig. 1 of Shinbara shows a seal 1 against the peripheral edge of the wafer

Regarding claim 59, Shinbara discloses supplying a second fluid provided by a nozzle 20 to the back/second side of the wafer (col 6, lines 55-60)

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

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the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 1-2, 4-9, 11, 16, 24, 65-66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shinbara (US 4,788,994) in view of Ohmi et al (US 5,487,398)

Shinbara discloses a method for treating wafer with liquid, the wafer/workpiece having a front/first side and an opposing back/second side and a peripheral edge defined between the first and second side, the method comprises:

placing the wafer/workpiece in a housing/chamber that includes an upper portion/ first chamber portion receiving the first side of the wafer/workpiece and a lower portion/second chamber portion receiving the second side of the wafer/workpiece, a perimeter portion receiving the edge of the wafer (fig. 1)

supplying a first fluid provided by nozzle 22 to the first chamber portion to expose the front/first side to the first fluid while excluding at least a major portion of the second side from exposure to the first fluid (col 6 , lines 59-62; fig. 1)

supplying a second fluid/etchant provided by nozzle 20 to the second chamber portion to expose the back/second side to the second fluid (col 6, lines 60-65)

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Unlike the instant claimed inventions as per claims 1, 8-9, 24, Shinbara fails to specifically disclose that the first fluid comprises an etchant for removal of metal/copper/etchant comprises HF and hydrogen peroxide/oxidizing agent

Ohmi discloses a method for cleaning wafer comprises a step of using an etchant comprises of HF and hydrogen peroxide to remove copper impurities from a wafer (col 4, lines 50-55)

One skilled in the art at the time the invention was made would have found it obvious to modify Shinbara method by using a first fluid/etchant comprises HF and hydrogen peroxide/oxidizing agent as per Ohmi because Ohmi discloses that it is preferably to use an chemical solution comprises HF and hydrogen peroxide to realize high-cleaniness cleaning with chemical solution free from secondary contamination of an object (col 9, lines 32-45)

Regarding claims 2, 18, Shinbara discloses that first and second fluids are supplied simultaneously to the front/first and back/second sides of the wafer/workpiece (col 7, lines 55-60)

Regarding claims 4-5, fig. 1-2 of Shinbara shows that the edges on the front and back of the wafer are exposed to the first fluid

Unlike the instant claimed invention as per claim 6, Shinbara fails to disclose that the first fluid comprises an inert purge gas. Ohmi also discloses flowing inert gas during wet cleaning (col 5, lines 45-53)

One skilled in the art at the time the invention was made would have found it obvious to modify Shinbara method by using the first fluid comprises an inert purge gas in view of

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Ohmi teaching because Ohmi discloses that it is possible to prevent native oxides from being formed by using the atmosphere of an inert gas (col 5, lines 55-58)

Regarding claim 7, Shinbara discloses that the fluid comprise rinse liquid (col 7, lines 54-56)

Regarding claim 11, Shinbara fails to disclose using ozone in the wet etchant. Ohmi discloses using ozone (2-10 ppm) in the cleaning solution/etching solution (col 10, lines 45-50)

One skilled in the art at the time the invention was made would have found it obvious to modify Shinbara method by using ozone in the wet etchant because Ohmi discloses that by incorporating the ozonizer into the cleaning apparatus, it is possible to downsize the apparatus and disuse peripheral unit (col 10, lines 56-58)

Regarding claim 16, Shinbara discloses providing the first fluid through the outlet 22 in the edge portion of the wafer (col 6, lines 60-65; fig. 1-2)

Regarding claim 17, fig. 1 of Shinbara shows a seal 1 against the peripheral edge of the wafer

Regarding claim 21-22, 66, Shinbara discloses a step of rotating/spinning the housing/chamber (fig. 1)

9. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shinbara (US 4,788,994) in view of Ohmi et al (US 5,487,398) and further in view of Yamamura (US 5,893,004)

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Shinbara as modified by Ohmi has been described above. Unlike the instant claimed invention as per claim 3, Shinbara and Ohmi fails to disclose that the first and second fluid are supplied at different time period

Yumamura discloses a method for dispensing developing solution on a wafer comprises a step of supplying first and second fluid at different time period (fig.3)

One skilled in the art at the time the invention was made would have found it obvious to modify Shinbara and Ohmi by supplying first and second fluid at different time period as per Yumamura to obtain a more controllable semiconductor processing step

10. Claims 10, 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shinbara (US 4,788,994) in view of Ohmi et al (US 5,487,398) and further in view of Tsuji (US 5,454,901)

Shinbara as modified by Ohmi has been described above. Unlike the instant claimed inventions as per claims 10, 12, Shinbara and Ohmi fails to disclose that the hydrofluoric acid is included at a level of 0.4 to 0.6 weight % and the hydrogen peroxide is included at a level of 5.0 to 15.0 weight % in the etchant

Tsuji discloses a process for treating semiconductor substrate comprises a step of treating the semiconductor substrate with a solution includes HF (0.1 to 10 wt %) and hydrogen peroxide (0.1 to 15 wt %) (see abstract)

Hence, one skilled in the art at the time the invention was made would have found it obvious to modify Shinbara and Ohmi method by treating the semiconductor substrate with a solution includes HF (0.1 to 10 wt %) and hydrogen peroxide (0.1 to 15 wt %) as

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per Tsuji because Tsuji discloses that the optimum HF concentration and hydrogen peroxide concentration are 0.1 to 10 wt % and 0.1-15 wt % (col 6, lines 10-15)

11. Claims 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shinbara (US 4,788,994) in view of Ohmi et al (US 5,487,398) and further in view of Lawrence (US 3,923,567)

Shinbara as modified by Ohmi has been described above. Unlike the instant claimed inventions as per claims 13-15, Shinbara and Ohmi fails to disclose that the etchant comprises HF, HCL and nitric acid/sulfuric acid and hydrogen peroxide

Lawrence discloses a method for reclaiming wafer comprises a step of using an etchant comprises HF, HCl and nitric acid (col 5, lines 55-60; col 6, lines 50-55)

One skilled in the art at the time the invention was made would have found it obvious to modify Shinbara and Ohmi method by using etchant comprises HCL and nitric acid/sulfuric acid because Lawrence discloses that sulfuric acid is used to remove the organic materials and a mixture of HCl and nitric acid is used to remove metal (col 5, lines 57-60)

12. Claims 26-27, 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shinbara (US 4,788,994) in view of Tsuji (US 5,454,901)

Shinbara discloses a method for treating wafer with liquid, the wafer/workpiece having a front/first side and an opposing back/second side and a peripheral edge defined between the first and second side, the method comprises:

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placing the wafer/workpiece in a housing/chamber that includes an upper portion/ first chamber portion receiving the first side of the wafer/workpiece and a lower portion/second chamber portion receiving the second side of the wafer/workpiece, a perimeter portion receiving the edge of the wafer (fig. 1)

supplying a first fluid provided by nozzle 22 to the first chamber portion to expose the front/first side to the first fluid while contacting the peripheral edge of the second side/no more than an outer margin of the second side with the first fluid (col 6 , lines 59-62; fig. 1-2)

Unlike the instant claimed inventions as per claims 26-27, Shinbara fails to specifically disclose that the first fluid comprises an etchant for removal metal comprises HF and hydrogen peroxide, the HF at a level of 0.4-0.6 wt %

Tsuji discloses a process for treating semiconductor substrate comprises a step of treating the semiconductor substrate with a solution includes HF (0.1 to 10 wt %) and hydrogen peroxide (0.1 to 15 wt %) to remove metallic impurities (see abstract)

Hence, one skilled in the art at the time the invention was made would have found it obvious to modify Shinbara method by treating the semiconductor substrate with a solution includes HF (0.1 to 10 wt %) and hydrogen peroxide as per Tsuji because Tsuji discloses that the optimum HF concentration are 0.1 to 10 wt % (col 6, lines 12-15)

Regarding claim 34, Shinbara discloses a step of rotating/spinning the housing/chamber (fig. 1)

Allowable Subject Matter

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13. Claims 19, 20, 23, 67-71 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 28-33 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Response to Arguments

14. Applicant's arguments, see pages 10-11 of the response, filed 7/10/2006, which argue that the reference of Miki (US 6,325,081) is not prior art and the grandparent 436 patent priority date is the priority date for the current application have been fully considered and are persuasive. However, upon further consideration, a new ground(s) of rejection is made in view of newly cited prior art of Shinbara (US, 4,788,994) that has an issued date of Dec 6, 1988

Conclusion

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lan Vinh whose telephone number is 571 272 1471. The examiner can normally be reached on M-F 8:30-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571 272 1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to be 'LV' followed by a stylized flourish.

LV

August 2, 2006